Identification of Novel Therapeutics for Danon Disease Using an iPS Model of the Disease

Grant Award Details

Identification of Novel Therapeutics for Danon Disease Using an iPS Model of the Disease

Grant Type: Early Translational III

Grant Number: TR3-05687

Project Objective: The goal of this DCF project is to establish feasibility of treating Danon disease cardiovascular phenotypes with a small molecule to be identified in a screen of Danon patient iPSC cells.

Investigator:

Name:	Eric Adler
Institution:	University of California, San Diego
Type:	PI

Disease Focus: Heart Disease, Pediatrics

Human Stem Cell Use: iPS Cell

Cell Line Generation: iPS Cell

Award Value: $1,701,575

Status: Closed

Progress Reports

Reporting Period: Year 1

View Report

Reporting Period: Year 2

View Report

Reporting Period: Year 3

View Report

Reporting Period: Y4 / NCE

View Report

Grant Application Details

Application Title: Identification of Novel Therapeutics for Danon Disease Using an iPS Model of the Disease

Public Abstract: Autophagy is the cells mechanism for breaking down and recycling proteins. Danon disease is an inherited disorder of autophagy. Patients with this disease have major abnormalities in heart and skeletal muscle and generally die by the time they are in their 20s. Recently we used a new technology to turn skin cells from two patients with this disease into stem cells. The objective of our work is to use these cells to find new medications. To achieve this objective we will use techniques we helped develop to make Danon disease stem cells into heart cells. We will then screen hundreds of thousands of different drugs on these heart cells, to find drugs that make these cells work better. The most promising drugs will be tested on mice with a genetic defect that is similar to those found in patients with Danon disease. When complete, the proposed research will result in the development of a drug suitable for clinical trials of patients with Danon disease. As impaired autophagy is associated with may other diseases, including heart failure, cancer and Parkinson's disease, it is possible that the drug identified will be suitable for treatment of a variety of ailments. Furthermore, the studies will serve as proof of concept for other stem cell based drug discovery systems.

Statement of Benefit to California: Heart failure is among the most common reasons Californians are hospitalized, and one of the greatest expenses for the health care system. Danon disease is a type of heart failure that patients inherit. It is rare but almost always fatal. Patients who suffer from Danon disease cannot correctly perform autophagy, which is a way that cells recycle proteins. We believe that our work will help in the development of new drugs to treat Danon disease. It is also possible that the drugs we discover will be useful for the treatment of other types of heart failure. As other disease such as cancer and Parkinson's disease are associated with impaired autophagy, these drugs may help them as well. From a public health perspective, the development of new drugs for heart failure would be of great benefit to Californians. Furthermore, the work could lead to additional grants from federal agency's, as well as larger studies on patients done in partnership with industry. Such studies have the potential of creating jobs and revenue for the state.